

## REMARKS

United States Serial No. 10/546,551 was filed on July 19, 2006. Claims 1-20 are currently pending in this application. Claim 10 has been canceled, and its subject matter incorporated into claim 3. Applicant respectfully requests reconsideration and allowance of claims 1-9 and 11-20.

### Claim Objections

Claims 2 and 4-20 have been objected to because, being dependent claims, it is alleged that they must begin with “the” rather than “a”. Claims 2 and 4-20 have been amended to comply with the Office’s request that the claims be corrected. Applicant therefore respectfully requests that this objection be withdrawn. The scope of the claims are unchanged by this formal amendment.

### 35 U.S.C. § 102

Claims 1-4, 7, 9, 12 and 15 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,442,018 to Rand (“Rand”). It is alleged that Rand teaches a solution and concentrate for generating stable aqueous foams, and a method of generating stable aqueous foams, that the foams have particular utility when used as foam drilling fluids for deep well drilling, and that the concentrate composition comprises water, a polyacrylic acid polymer, and an anionic surfactant of sodium lauryl sulfate or alpha olefin sulfate.

Rand discloses a foam concentrate or solution suitable for use in foam security systems, where the foam is dispersed to obstruct visibility or to restrict access to a secured area. Rand only cursorily mentions that the foams may be used “as foam drilling fluids for deep well drilling”. Rand does not disclose or suggest that the foam may be injected at the cutting head of an earth pressure balance tunnel boring machine during tunnel boring operations, as claimed in the present application.

With regard to claims 1, 2 and 15, Applicant respectfully submits that Rand, in addition to the above, does not disclose all of the elements of independent claim 1 as presently amended.

MPEP § 2131 states that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegall Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 . . . (Fed. Cir. 1987).” MPEP at 2100-67. Independent claim 1 has been amended to more clearly recite the use of the earth pressure balance tunnel boring machine means as a part of the claimed method. Since Rand does not disclose the use of an earth pressure balance tunnel boring machine in a drilling operation, claim 1 is not anticipated by Rand.

Since this element of claim 1 is also an element of claims 2 and 15, which depend from claim 1, claims 2 and 15 are also not anticipated by Rand. Applicant respectfully requests that the 35 U.S.C. § 102(b) rejection of claims 1, 2 and 15 be withdrawn.

With regard to claims 3-4, 7, 9, and 12, Applicant respectfully submits that Rand does not disclose all of the element of independent claim 3, as currently amended. Claim 3 has been amended to more clearly state the subject matter which is being claimed by incorporating the subject matter of claim 10, which recites that the acrylic acid-based polymer has a molecular weight from 2,000 to 20,000.

MPEP § 2131 states that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegall Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 . . . (Fed. Cir. 1987).” MPEP at 2100-67. Rand discloses utilization of a polyacrylic acid polymer with a molecular weight of about 500,000. Therefore, Rand does not disclose utilization of an acrylic acid-based polymer having a molecular weight from 2,000 to 20,000, and Rand does not anticipate claim 3.

Since this element of claim 3 is also an element of claims 4, 7, 9 and 12, which depend directly or indirectly from claim 3, claims 4, 7, 9 and 12 are also not anticipated by Rand. Applicant respectfully requests that the 35 U.S.C. § 102(b) rejection of claims 3, 4, 7, 9 and 12 be withdrawn.

### 35 U.S.C. § 103

Claims 1-4, 7, 9, 12 and 15-20 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Rand. While the Office has admitted that Rand does not expressly disclose the injection rate of the foamed aqueous surfactant solution per cubic meter of excavated soil, it is alleged that the variation of the injection rate of the foamed surfactant solution in order to obtain the optimum performance would be obvious to one of skill in the art at the time the invention was made.

Applicant's discussion of the deficiencies of Rand above, with respect to the 35 U.S.C. § 102(b) rejection, is incorporated herein by reference. The Office's allegations regarding the injection rate as recited in present claims 16-20 do nothing to cure the deficiencies of Rand, namely that Rand does not disclose either the use of an earth pressure balance tunnel boring machine or an acrylic acid-based polymer having a molecular weight of 2,000 to 20,000. As these limitations appear in independent claims 1 and 3, respectively, and claims 2, 4, 7, 9, 12 and 15-20 depend, either directly or indirectly, from claims 1 or 3, Rand does not teach or suggest the subject matter of any of these claims.

Further, Rand does not disclose the manner in which its aqueous foam is used for deep well drilling, nor does it disclose any injection rate whatsoever. There would be nothing in Rand to suggest to one of ordinary skill – in another art, tunnel boring as contrasted to deep well drilling, how to determine a suitable injection rate.

Applicant therefore respectfully requests that the 35 U.S.C. § 103(a) rejection of claims 1-4, 7, 9, 12 and 15-20 be withdrawn.

Claims 1-9, 12 and 15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Rand, in view of U.S. Patent No. 3,215,200 to Kirkpatrick, et al. ("Kirkpatrick"). While it is admitted by the Office that Rand does not disclose the surfactant further comprising polyalkylene alkyl ether sulfate, it is alleged that Kirkpatrick teaches foaming agents using anionic surface-active agents of polyoxyethylated organic compounds having a hydrophobic

organic base and a hydrophilic polyoxyethylene chain, and that it would have been obvious to a person of ordinary skill in the art to utilize Kirkpatrick's foaming agent in the fluid of Rand.

Applicant's discussion of the deficiencies of Rand above, with respect to the 35 U.S.C. § 102(b) rejection, is incorporated herein by reference. The Office's allegations regarding the polyalkylene alkyl ether sulfate, as recited in present claims 5 and 6, does nothing to cure the deficiencies of Rand with respect to independent claims 1 and 3. Further, the Office's allegations do not state why the combination of Rand and Kirkpatrick render claims 1-4, 7-9, 12 and 15 obvious, so it is unclear why these claims have been rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Rand and Kirkpatrick. Kirkpatrick discloses the use of foam to remove invading water from a well bore, and does not motivate one of skill in the art of tunnel boring using an earth pressure balance tunnel boring machine to use the claimed method to maintain a bored tunnel face without causing the soil at the surface to rise. (See specification, page 1, lines 5-25). The Office has not met its burden of establishing a prima facie case of obviousness with regard to claims 1-4, 7-9, 12 and 15.

Rand, Kirkpatrick, or any combination thereof do not teach or suggest either the use of an earth pressure balance tunnel boring machine or an acrylic acid-based polymer having a molecular weight of 2,000 to 20,000. As these limitations appear in independent claims 1 and 3, respectively, and claims 2, 4-9, 12 and 15 depend, either directly or indirectly, from claims 1 or 3 these references do not teach or suggest the subject matter of these claims. Applicant therefore respectfully requests that the 35 U.S.C. § 103(a) rejection of claims 1-9, 12 and 15 be withdrawn.

Claims 1-4, 7 and 9-15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Rand in view of U.S. Patent No. 4,013,568 to Fischer, et al. ("Fischer"). While the Office has admitted that Rand does not disclose an acrylic acid based polymer salt having a molecular weight of 2,000 to 20,000, the Office has alleged that Fischer teaches a drilling fluid containing a salt of a high molecular weight acrylic polymer having an average molecular weight of 5,000 to 50,000.

Applicant's discussion of the deficiencies of Rand above, with respect to the 35 U.S.C. § 102(b) rejection, is incorporated herein by reference. Fischer is also directed to deep well drilling into subterranean formations. The Office's allegations regarding the molecular weight of the acrylic acid salt does nothing to cure the deficiency of Rand with respect to present independent claim 1, which recites, in pertinent part, the use of an earth pressure balance tunnel boring machine. For this reason, the method of independent claim 1 is not taught or suggested by Rand, Fischer, or any combination thereof. Therefore, the subject matter of claims 2 and 15, which depend from claim 1, is also not taught or suggested by the references or any combination thereof. Applicant therefore respectfully requests that the 35 U.S.C. § 103(a) rejection of claims 1, 2 and 15, based upon the combination of Rand and Fischer, be withdrawn.

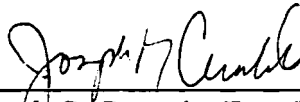
Further, Applicant respectfully submits that Rand and Fischer cannot properly be combined. MPEP § 2143.01(V) states that "[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)". MPEP at 2100-140. Rand discloses, at column 2, lines 58-59, that the disclose polyacrylic acid polymers "generally have molecular weights of about 500,000." Conversely, Fischer, at column 5, lines 64-66, discloses that the polymer should have an average molecular weight in the range of 5,000 to 50,000. Rand, which is the prior art invention being modified, would be rendered unsatisfactory for its intended purpose if the average molecular weight of the polymer was reduced from about 500,000 to a range of from 5,000 to 50,000. Rand specifically discloses that a molecular weight of about 500,000 is required for the invention, so to reduce that molecular weight by one to two magnitudes, would drastically change the Rand invention, necessarily rendering the it unsatisfactory for its intended purpose.

Since the combination of Rand and Fischer is improper, the Office's rejection of claims 3-4, 7, and 9-14 does not meet the burden of establishing a prima facie case of obviousness. Applicants therefore respectfully request that the 35 U.S.C. § 103(a) rejection of claims 3-4, 7, and 9-14 be withdrawn.

In light of the amendments and remarks set forth above and submitted herewith, Applicant respectfully requests that the objections to and 35 U.S.C. §§ 102 and 103 rejections of claims 1-20 be withdrawn and that a formal Notice of Allowance be issued with respect to claims 1-9 and 11-20.

Should there be any questions regarding the above amendments or remarks, the undersigned attorney would welcome a telephone call.

Respectfully submitted,



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July 21, 2009  
Date